acid sequence identity to the 441-676 segment of SEQ ID NO:2, is capable of catalyzing ODA oxidation, and has ***a molecular weight of between 40 to 60 kDa***. The naturally-occurring vanadium bromoperoxidase isolated from *Fucus*, which, according to the cited references, has a molecular weight of 64-65 kDa, is therefore not within the scope of the pending claims as amended.

In the Advisory Action, the Examiner further pointed to page 22 line 8 of the specification where a reference is made to a 60 kDa vanadium peroxidase found in a brown alga, *Ascophyllum*. Applicant notes that the C-terminal 232 amino acids of *Ascophyllum* vanadium peroxidase has only 85.8% sequence identity to the corresponding region of SEQ ID NO:2, which is approximately the 236 amino acids of the 441-676 segment (see page 23 lines 6-9). The claims as amended recite at least 90% sequence identity in the 441-676 region of SEQ ID NO:2, *Ascophyllum* vanadium peroxidase is therefore not encompassed by the claims.

As such, Applicant respectfully requests that the rejections under 35 USC §102 be withdrawn.

The Examiner bears the initial burden of factually supporting a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, three criteria must be met. First, there must be some suggestion or motivation provided by prior art or the general knowledge one skilled artisan is expected to have to make the modification; second, there must be a reasonable expectation of success; third, prior art must teach or suggest all elements of the claims. MPEP §2142.

The two cited references do not disclose the amino acid sequence of the vanadium bromoperoxidase, let alone the significance of the 441-676 region of SEQ ID NO:2. The Examiner has not identified anything in the cited references that would lead one of skill to prepare a fragment with enzymatic activity and a molecular weight of between 40 to 60 kDa. Considering the average molecular weight of about 110 Dalton for an amino acid, a polypeptide having a molecular weight of 40 to 60 kDa translates into about 360 to 540 amino acids in length. There is no showing that the polypeptide

fragments as claimed was known or suggested to be sufficient to retain the enzymatic activity. Since no *prima facie* obviousness has been established, Applicant respectfully requests the withdrawal of the rejections under 35 USC §103.

During the telephonic interview, the Examiner asserted that the specification provides no evidence that the 441-676 segment of SEQ ID NO:2 would have the enzymatic activity of the claimed vanadium peroxidase. To expedite prosecution, Applicant has amended the claims to recite a lower limit of the molecular weight of about 40 kDa for the claimed polypeptides. This element is supported not only by the specification, as stated above, but also by the originally submitted claim 21. As such, Applicant submits the present amendment is fully supported by the specification and should be properly entered.

In addition, Applicant wishes to clarify a point made in the Examiner's Interview Summary (mailed May 1, 2003). During the telephonic interview, a reference by Vilter, H., *Biological Systems,* 31, *Vanandium and Its Role in Life*, Sigel, et al., (Eds.), Marcel Dekker, New York, N.Y., pp. 325-362 (1995) was discussed. The Vilter reference discloses the amino acid sequence of a C-terminal segment of the *Ascophyllum* vanadium peroxidase. The present invention discloses the amino acid sequence of the full length *Fucus* vanadium bromoperoxidase. The Vilter reference was cited to show a high level of sequence homology between the C-terminal regions of the two closely related enzymes and support the contention that the 441-676 segment of SEQ ID NO:2 has enzymatic activity. During the interview, Applicant's attorney did not assert that this reference teaches or suggests the claimed polypeptides. Such sequence homology is revealed ***only*** in light of the present disclosure. The Vilter reference thus neither teaches not suggests the present invention.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,

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APPENDIX A

VERSION WITH MARKINGS TO SHOW CHANGES MADE

16. (Twice Amended) An isolated polypeptide comprising an amino acid sequence having at least 90% amino acid sequence identity to a sequence from residue 441 to residue 676 as set forth in SEQ ID NO:2, wherein the polypeptide catalyzes oxidation of o-dianisidine (ODA) when complexed with a vanadium ion, and has a molecular weight of between about 40 to about 60 kDa [no more than about 600 amino acids in length].

APPENDIX B

CLAIMS UNDER EXAMINATION

16. (Twice Amended) An isolated polypeptide comprising an amino acid sequence having at least 90% amino acid sequence identity to a sequence from residue 441 to residue 676 as set forth in SEQ ID NO:2, wherein the polypeptide catalyzes oxidation of o-dianisidine (ODA) when complexed with a vanadium ion, and has a molecular weight of between about 40 to about 60 kDa.

17. (As filed) The isolated polypeptide of claim 16, wherein the polypeptide has at least 80% identity to a polypeptide as set forth in SEQ ID NO:2.

20. (As filed) The isolated polypeptide of claim 16, wherein the polypeptide has a molecular weight of about 58 kD.

21. (As filed) The isolated polypeptide of claim 16, wherein the polypeptide has a molecular weight of about 40 kD.

22. (As filed) The isolated polypeptide of claim 16, wherein the polypeptide is immobilized on a solid surface.

23. (As filed) The isolated polypeptide of claim 16, wherein the polypeptide further comprises a cleavable linker sequence.

24. (As filed) The isolated polypeptide of claim 23, wherein the cleavable linker sequence is an enterokinase cleavable linker sequence.

25. (As filed) The isolated polypeptide of claim 16, wherein the polypeptide further comprises an epitope tag.

26. (As filed) The isolated polypeptide of claim 25, wherein the epitope tag comprises a plurality of histidine residues.

27. (As filed) The isolated polypeptide of claim 16, wherein the polypeptide further comprises a thioredoxin sequence.

28. (As filed) A method for enzymatically halogenating a compound, the method comprising contacting the compound with an isolated polypeptide of claim 16.

29. (As filed) The method of claim 28, wherein the compound is a protein.

30. (As filed) A method for enzymatically oxidizing a compound, the method comprising contacting the compound with an isolated polypeptide of claim 16.